DOCUMENT RE[illegible]

ED 104 524 PS 007 733

AUTHOR Carroll, James L.
TITLE Short Term Visual Memory in Five- and Six-Year-Old Children: Some Cognitive and Academic Correlates.
PUB DATE 31 Aug 74
NOTE 11p.; Paper presented at the Annual Convention of the American Psychological Association (82nd, New Orleans, Louisiana, August 31, 1974)

EDRS PRICE MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS Diagnostic Tests; Elementary School Students; Kindergarten Children; Literature Reviews; *Memory; Mnemonics; *Reading Achievement; Reading Development; *Reading Research; Remedial Instruction; *Retarded Readers; *Visual Learning

ABSTRACT

This paper presents a review of research in which correlations between short term visual memory and reading achievement have been found. Included is a table summarizing the major research which made use of commercially available tests of short term visual memory suitable for use with children 8-years of age and older. The researcher, tests used, subject characteristics, and results are given for each experiment. Research relating to the development of a motor-free, multiple-choice visual memory scale, which eliminates the developmental biases of the commercial tests and is, therefore, suitable for 5-, and 6-year-olds, is described in greater detail. Several experiments are described which sought to remediate visual memory problems through visual mnemonic devices and visual memory training. It is concluded that a great deal more research in these areas is necessary. (ED)

OCT. 1 8 1974

Short Term Visual Memory in Five - and Six - Year Old Children: Some Cognitive and Academic Correlates

James L. Carroll

Central Michigan University

U.S. DEPARTMENT OF HEALTH EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED104524

One area of memory function that has been of particular interest to psychology has been visual memory. One reason for the interest has been the attempt to correlate short-term visual memory with such behavioral characteristics as reading problems, learning disabilities and some aspects of central nervous system impairment. It has been hypothesized that visual memory may be an important factor in many areas of the learning process since for academic subjects, such as reading, the child must be able to recall information that has been visually presented.

Table 1 briefly reviews general work in the area of short-term visual memory for designs as related to reading achievement.

Table 1

Summary table of some research using commercially - available tests of short - term visual memory for form

Researcher	Test Used	Subjects	Results
Walters (1961)	MFD	35, 7.5 to 8.5 year old children	Significant correlation between MFD and reading retardation but not IQ and MFD
Lyle (1968)	MFD	54 good and 54 poor readers of average IQ between ages 6.5 to 12.5	Found that the two groups differed significantly on MFD

PS 007733

Presented August 31, 1974 at the American Psychological Association Annual Meeting in New Orleans.

00002

Table I (Cont'd)

Researcher	Test Used	Subjects	Results
Benenson (1972)	MFD	192 first grade children	Reported a relationship between MFD scores and early reading achievement.
Levine and Fuller (1972)	Benton	14, 10 year old disabled readers	The Ss did more poorly than did the normative group but no difference was found for 9 -, 11 -, 12 -, and 13 -, year - olds.
Golden and Steiner (1969)	ITPA-VSM	2 groups of 20 children matched on MA, CA, and IQ	-No differences between good and poor readers.
Barron (1971)	ITPA - VSM	-	-Both these studies suggested that poor readers were deficient in both auditory and visual memory.
Merlin (1971)	ITPA - VSM		

The implications of tests of short-term visual memory for school and clinical psychologists seem obvious. By being able to describe a child, with his various strengths and weaknesses, we may more fully be capable of understanding how that child functions in relation to other children and to his environment. It seems especially important to attempt to detect impairments in visual memory at as early an age as possible, perhaps at the pre-kindergarten level but certainly when he first enters school.

While they may be usefull most of the above mentioned tests of visual memory have

a significant weakness in that they are suitable only for children 8 yr. of age or older. The reason is that both scales depend upon the paper-and-pencil reproductions of rather complex stimuli which in turn depends upon the child's developmental level, a developmental level largely determined by maturation. As long as the paper-and-pencil output component exists, tests such as the Memory-for-Designs and Benton scale will be limited in their use. For these reasons a new test of immediate visual memory which largely eliminates the output difficulties previously discussed (visual motor integration and fine motor paper and pencil execution) was developed.

Carroll (1972) reported the development of a motor-free, multiple-choice visual memory scale which largely eliminates the previous mentioned difficulties. This test was designed to be used with 5 and 6-yr. old children; children who are developmentally unable to reproduce the rather complex designs found on existing reproduction tests of short-term visual memory. The test, composed of 35 stimulus cards and 35 multiple-choice retention places (four choices per card), was administered to 198 5- and 6-yr. old children (Group 1) attending kindergarten and first grade in a primarily white, middle-class suburban school district in central New Jersey. The Ss were shown a stimulus design for 5 sec.; the stimulus design was then removed, and S was shown a card with several designs on it (including the one he had just seen) and he was asked to indicate the correct design. This procedure was followed for all 35 cards and the number of errors was recorded. The test, like the prior ones, can be considered a test of memory for visual form.

A significant difference in error scores for 5- and 6-yr.-ols in Group 1 was noted, with the 6-yr.-olds making fewer errors than the 5 yr.-olds. The WRAT reading test was administered to a random subsample of 60 first grade pupils in Group 1 during the sixth month

of school. Pearson product-moment correlation between test errors and the WRAT was -.25 (df =59, $p < .05$). The correlation between the VMS and the Harper-Row Reading Readiness test was -.39 (df = 90, $p < .05$) for the kindergarten Ss. Later ;in the same school year, an alphabet recognition test was given to the kindergarten Ss and the correlation was -.40. There was no significant relationship with chronological age, intelligence, and sex and the visual memory scores for either group.

The recognition memory test was also administered to groups of 13 non-neurologically impaired retardates (Group 2) and 19 neurologically impaired retardates (Group 3). There was a significant difference in the performance of the two groups, Group 3 having significantly more errors (M=12.1) than Group 2 (M=8.9)

Several more recent studies using a Revised (25 item) VMS investigated the following:

1) word recognition in kindergarten, first, and second grade children
2) reading comprehension in second grade children
3) a comparison of visual and auditory short-term memory in five-six and seven year olds.

The subjects were kindergarten, first, and second grade pupils (N=20 for each group) randomly selected by grade level from a population of 60 pupils at each of the 3 grade levels. A revised version of the VMS, with the non-discriminating items removed was used. The reading subtests of the PIAT were used as was Information and Digit Span on the WISC. The following tables summarize the various findings.

Table 2

Correlations between VMS errors and Reading Recognition raw scores on the PIAT by grade.

Grade	N	r	p
Kindergarten	20	-0.63*	$< .05$
First	20	-0.56	$< .05$
Second	20	-0.65**	$< .05$

*with the effects of IQ, as measured by the WISC Information subtest partialed out, $r = -0.54$, $p < .05$

**for these Ss the correlation between Comprehension and the VMS was -0.70.

Table 3

Correlations between VMS errors and WISC Information subtest raw scores by grade

Grade	N	r	p
Kindergarten	20	-0.50	$< .05$
First	20	-0.02	$> .05$
Second	20	-0.04	$> .05$

Table 4

Correlations between VMS errors and WISC Digit Span subtest raw scores by grade

Grade	N	r	p
Kindergarten	20	-0.59	< .05
First	20	-0.05	> .05
Second	20	-0.29	> .05

Results suggest that the motor-free VMS can supply the School Psychologist with important data that bears a direct relationship to academic achievement.

Some researchers have theorized that early school experiences may have a profound effect on future learning. Bateman (1968), looking specifically at short-term memory, has noted that children having severe and persistent reading problems show impairment in auditory and visual memory as measured by the Illinois Test of Psycholinguistic Abilities (ITPA). She hypothesized that children having poor visual memory will experience difficulty in school if they are taught largely by a visual method and may begin to develop a set of negative expectations and become demoralized.

Getman and Kane (1964) have suggested methods of improving short-term memory for visual form which can be readily used in the regular classroom with children as young as five. Michael, King, and Moorehead (1969) have described a visual memory program utilizing visual mnemonic devices designed to enhance the development of visual memory for words. While the system apparently has been used in several educational settings, validation studies have not been reported. Haltom (1970) has proposed various informal tests that the classroom teacher can easily use to assess visual memory and remediate visual memory difficulties. Again, however, the suggestions appear to be "arm-chair" in nature, not supported by research data.

A recent study does provide data which suggest that visual memory problems may be remediated. Rusalem (1973) has reported that children in classrooms for the learning disabled may profit from instruction in visual memory training. Utilizing 32 experimental and

32 control Ss (with no difference in age, IQ or sex), she found that training in auditory and visual-sequential memory, attention and positive achievement motivation led to significant improvement on the visual and auditory sequential memory subtest of the ITPA ($F=36.36$, $df=1/63$, $p<.01$ and $F=52.47$, $df=1/63$, $p<.01$ respectively) and the spelling subtest of the Peabody Individual Achievement Test ($F=13.24$, $df=1/63$, $p<.01$).

While there have been many references in the literature suggesting that visual memory impairments, if detected, could be remediated, it appears that most of the educational suggestions are tentative in that they have not been subjected to validation. Research on memory, the correlates of good and poor memory function and the remediation of memory deficit, is required.

REFERENCES

Barron, R.C. A comparison of patterns of intellectual and psycholinguistic abilities among first graders with average and very low reading ability. Dissertation Abstracts International, 1971 (Sept.) 32 (3-B), 1817.

Carroll, J.L. A visual memory scale designed to measure short-term visual recognition memory in 5- and 60year old children. Psychology in the School, 1972, 9, 152-158.

Getman, G.N., & Kane, E.R. The physiology of readiness. Minneapolis, Minn.: Programs to Accelerate School Success, 1964.

Golden, N.E. & Steiner, S.R. Auditory and visual functions in good and poor readers. Journal of Learning Disabilities, 1969, 9, 476-481.

Haltom, C.M. Informal assessment and remediation of visual memory deficits. Teaching Exceptional Children, 1970, 3, 33-42.

Levine, M., & Fuller, G.B. Psychological, neurological and educational correlates of reading deficit. Journal of Learning Disabilities, 1972, 9, 563-571.

Lyle, J.G. Performance of retarded readers on the Memory-for Designs Test. Perceptual and Motor Skills, 1968, 26, 851-854.

Merline, S.B. The psycholinguistic and reading abilities of educable mentally retarded readers. Dissertation Abstracts International. 1971 (Oct.), 32, (4-A), 1921-1922.

Michael, L.D., King, J.W., & Moorhead, A. Visual memory and its relationship to learning. In P.M. Wold (Ed.) Visual and perceptual aspects for the achieving and underachieving child. Seattle, Wash.: Special Child Publ., 1969.

Rusalem, H.J. Effect of group training in short-term memory on children. A research study presented at the 10th International Conference of the Association for Children with Learning Disabilities on Mar. 16, 1973.

Walters, C.E. Reading ability and visual-motor function in second grade childrn. Perceptual and Motor Skills, 1961, 13, 370.